

Having thus described the present invention, it is now claimed:

1. An apparatus for measuring resistance to fluid flow from an associated ink cartridge comprising:

a fixture adapted to receive the associated ink cartridge therein;

an ink removal device operatively connected to the fixture through a fluid line for removing ink from the associated ink cartridge in a controlled manner;

a sensor monitoring flow to the ink removal device and forwarding data relating to such flow to a processor; and

an air removal device selectively connected to the fluid line via a valve for removing air therefrom.

2. The apparatus of claim 1 wherein the ink removal device is a first syringe.

3. The apparatus of claim 2 further comprising a syringe pump operatively connected to the first syringe for controlling movement of a plunger thereof and thereby controlling removal of ink from the associated ink cartridge.

4. The apparatus of claim 3 wherein the air removal device is a second syringe.

5. The apparatus of claim 2 wherein the air removal device is a second syringe.

6. The apparatus of claim 1 wherein the air removal device is a second syringe.

7. The apparatus of claim 1 wherein the ink removal device is connected to an internal cavity of the associated ink cartridge through an outlet port thereof.

8. The apparatus of claim 1 wherein the ink removal device includes a variable, pulseless pump.
9. The apparatus of claim 1 wherein the valve is a three-way valve that is interconnected in the fluid line between the fixture and the ink removal device for selectively purging the fluid line of air.
10. A method of measuring impedance to flow of ink from an ink cartridge with a testing system that includes a fixture for holding the ink cartridge, a pulseless pump operatively connected to the fixture via a fluid line, a sensor including a pressure transducer for monitoring fluid line pressure, and an air removal syringe operatively connected to the fluid line, the method comprising the steps of:
  - inserting an ink cartridge into a fixture;
  - removing ink from an outlet port of the ink cartridge through the fluid line;
  - monitoring the fluid line with the pressure transducer ; and
  - sending data from the pressure transducer representative of flow through the fluid line to a processor.
11. The method of claim 10 comprising the further step of varying a rate of ink removal from the ink cartridge.
12. The method of claim 10 comprising the further step of removing air from the testing system after the ink cartridge has been inserted into the fixture.
13. The method of claim 10 including the step of developing fluid impedance characteristics of the ink cartridge based on the collected data.
14. A testing apparatus for measuring ink flow characteristics of a cartridge comprising:

a fixture dimensioned to receive an associated ink cartridge therein;  
a fluid passage communicating with the fixture at an outlet of the associated ink cartridge;  
a syringe pump operatively associated with the fluid passage for pumping ink from the associated cartridge at a selected flow rate;  
an air removal syringe communicating with the fluid passage for withdrawing air from the system; and  
a pressure transducer monitoring flow through the fluid passage and providing data to a processor for storing and information relating to impedance characteristics of the cartridge.

15. The system of claim 14 further comprising a valve interposed between the air removal syringe and the fluid passage for selectively interconnecting the valve with the system.